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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,924	06/26/2003	Pieter van Rooyen	RONI-012/01US (186980-202)	3857
23446	7590	05/03/2005	EXAMINER	
MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661			AHN, SAM K	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/606,924	Applicant(s) ROOYEN ET AL.	
	Examiner Sam K. Ahn	Art Unit 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>041304</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1-5 and 18 are objected to because of the following informalities:

In claim 1, lines 5 and 6, delete "the channel-coded" and insert "the plurality of channel-coded".

In claim 18, line 9, delete "de-interweaver" and insert "de-interleaver".

Claims 2-5 directly depend on claim 1. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5 recites wherein the signal complies with various communication protocols, where not all the protocols (e.g. GMSK, CCK) recited was described in the specification.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-4,6,9-11 and 13-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Seshadri et al. USP 6,584,593 B1 (Seshadri).

Regarding claims 1,6 and 13, Seshadri discloses a method and an apparatus for transmitting a signal from a plurality of antennas (see Fig.1) comprising: an outer encoder or channel encoding means (31) configured to encode a stream of data according to a turbo multiple trellis coded modulation scheme (note col.2, lines 35-37), thereby generating a plurality of channel-coded symbol streams; an inner core or space-time encoding means (32) configured to receive the plurality of channel-coded symbol streams and provide space-time coding to the plurality of channel-coded symbol streams, thereby generating a plurality of space-time-channel-coded symbol streams (note col2, lines 37-39); and a plurality of antennas (33,34) coupled to the inner encoder, wherein each of the plurality of antennas is configured to transmit one of the plurality of space-time-channel-coded symbol streams.

Regarding claims 2,3,9,10,14 and 15, Seshadri teaches all subject matter claimed, as applied to claim 1,6 or 13. Seshadri further teaches wherein the space-time encoding includes block space-time coding (note col,4, lines 7-10 and 32-33) and convolutional space-time coding (note col.5, lines 27-38).

Regarding claims 4 and 11, Seshadri teaches all subject matter claimed, as applied to claim 1 or 6. Seshadri further teaches wherein the encoding the streams of data includes maximizing a coding gain (note col.1, line 60 - col.2, line 3) and the space-time encoding includes maximizing diversity gain (note col.1, lines 54-57).

Regarding claims 16 and 17, Seshadri discloses a method and an apparatus of a transceiver comprising a transmitter portion including: an outer encoder or channel encoding means (31) configured to encode a stream of data according to a turbo multiple trellis coded modulation scheme (note col.2, lines 35-37), thereby generating a plurality of channel-coded symbol streams; an inner core or space-time encoding means (32) configured to receive the plurality of channel-coded symbol streams and provide space-time coding to the plurality of channel-coded symbol streams, thereby generating a plurality of space-time-channel-coded symbol streams (note col2, lines 37-39); and a plurality of antennas (33,34) coupled to the inner encoder, wherein each of the plurality of antennas is configured to transmit one of the plurality of space-time-channel-coded symbol streams. Seshadri further discloses a receiving portion comprising: at least one antenna (23,24) for receiving a plurality of transmitted space-time-channel-coded symbol streams, thereby generating a plurality of received space-time-channel-coded symbol streams; space-time decoder (21) coupled to the at least one antenna, wherein the space-time decoder is configured to decode the plurality of

received space-time-channel-coded symbol streams, thereby generating at least one channel-coded symbol stream (note col.2, lines 38-39); and a channel decoder (22) configured to decode the at least one channel coded symbol stream, thereby generating a stream of received data. And although Seshadri does not explicitly teach the transmitter and receiver portions housed together, it is inherent since the teaching of Seshadri teaches a communication between a base station and a terminal unit, otherwise, there would only be a one way communication. Thus, in order to achieve two way communication, a transmitter and a receiver housed in one system is necessary.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seshadri et al. USP 6,584,593 B1 (Seshadri) in view of Ling et al. US 2003/0043928 A1 (Ling).

Regarding claim 5, Seshadri teaches all subject matter claimed, as applied to claim 1. Although Seshadri teaches wireless communication between two units

(see Fig.1), Seshadri does not explicitly disclose a communication protocol implemented.

Ling also teaches wireless communication between two units (see Fig.1) and further teaches communication protocols (CDMA, TDMA, OFDM, QPSK and QAM, note paragraphs 4-5). Therefore, it would have been obvious to one skilled in the art at the time of the invention to design using these communication protocols for the purpose of supporting well-known communication protocols, thus capable of adapting to currently existing systems in the market.

Regarding claim 7, Seshadri teaches all subject matter claimed, as applied to claim 6. Although Seshadri teaches an outer encoder (31), Seshadri does not teach wherein the outer encoder includes a plurality of parallel chains, wherein each of the coding chains includes a trellis coded modulation encoder, a block symbol interleaver and a QPSK mapper unit, wherein the plurality of coding chains generates the plurality of channel-coded symbol streams.

Ling teaches an outer encoder (712a~712k in Fig.7) including a trellis coded modulation encoder (note paragraphs 68 and 159), a block symbol interleaver (note paragraph 68) and a QPSK mapper unit (supporting QPSK, note paragraph 64), wherein the plurality of coding chains generates the plurality of channel-coded symbol streams. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Seshadri's outer encoder with Ling's

for the purpose of supporting plurality of channels for data and control (note paragraphs 130-131).

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seshadri et al. USP 6,584,593 B1 (Seshadri) in view of Kapoor et al. USP 6,795,424 B1 (Kapoor).

Regarding claim 8, Seshadri teaches all subject matter claimed, as applied to claim 6. Although Seshadri teaches plurality of antennas (33,34 in Fig.1), Seshadri does not explicitly teach wherein the plurality of antennas are arranged so that the fading correlation between the antennas is below 0.5.

Kapoor teaches plurality of antennas (see 52 in Fig.5) wherein the plurality of antennas are arranged so that the fading correlation between the antennas is below 0.5 (note col.12, line 65 – col.13 line 4). Therefore, it would have been obvious to one skilled in the art at the time of the invention to arrange the plurality of antennas having fading correlation below 0.5 for the purpose of having almost perfect correlation, as taught by Kapoor.

4. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seshadri et al. USP 6,584,593 B1 (Seshadri) in view of Scalise et al. USP 6,785,861 B2 (Scalise).

Regarding claim 12, Seshadri teaches all subject matter claimed, as applied to claim 6. Although Seshadri teaches an outer encoder (31) and inner encoder



(32), Seshadri does not teach and interleaver interposed between the outer encoder and the inner encoder.

Scalise teaches an interleaver (8 in Fig.3) receiving encoded data stream from an outer encoder (6) wherein it is further passed on to an inner encoder (8).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Seshadri's system to interpose the interleaver between the outer encoder and inner encoder, and having an inner decoder in the receiver, as taught by Scalise, for the purpose of improving communication between transmitter and receiver by detecting the errors (note col.6, lines 4-8).

***Allowable Subject Matter***

5. Claim 18 would be allowable if rewritten or amended to overcome the claim objections, set forth in this office action.
6. The following is a statement of reasons for the indication of allowable subject matter:  
Present application discloses a system comprising an outer encoder and an inner encoder and plurality of antennas for optimal transmission. Closest prior art, Seshadri teaches all subject matter claimed. However, Seshadri does not teach or suggest the combination of the limitations of a QPSK mapper, a first MTCM encoder and QPSK mapper unit, a first symbol selector and puncturer, a symbol interleaver, a second MTCM encoder and QPSK mapper unit, a symbol de-interleaver arrangement, a second symbol selector and puncturer, an inner encoder and a plurality of antennas configured as recited.


Art Unit: 2637

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam K. Ahn  
4/25/05

  
TEMESGHEN GHEBREYES  
PRIMARY EXAMINER